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=> s dentrit? and etch?

140 DENTRIT?

157940 ETCH?

L1 6 DENTRIT? AND ETCH?

=> d all 1-6

L1 ANSWER 1 OF 6 CA COPYRIGHT 2002 ACS

AN 89:10775 CA

TI Appearance form of iron compounds in ceramics during scanning electron microscope studies

AU Berger, Iris; Lange, Peter

CS Sekt. Baustoffverfahrenstech., Hochsch. Archit. Bauwes., Weimar, E. Ger.

SO Silikattechnik (1977), 28(11), 332-4

CODEN: SITKA7; ISSN: 0037-5233

DT Journal

LA German

CC 57-7 (Ceramics)

AB SEM (scanning electron microscopy) examns. of ceramics with added Fe and Fe compds. obtained under various heating and oxidative conditions were used to identify the type of reaction, if any, between the ceramic and the Fe and the changes occurring in the Fe and ceramics; the Fe remained unchanged at 1100.degree.. At 1200-1300.degree., the Fe somewhat penetrates into the surrounding ceramic, but without reaction. At 1400.degree., magnetite [1309-38-2] is formed, with a **dentritic** magnetite zone of peneration. At higher temps., magnetite **dentritic** formation is readily identified, even without prior **etching** of sample. Magnetite is formed under reducing conditions as isometric zonal crystals even at <1200.degree.. Other reaction products of Fe are also obsd. by SEM.

ST iron reaction ceramic magnetite

IT Ceramic materials and wares

(reaction of, with iron in situ)

IT 1309-38-2P, preparation

RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)

(formation of, in ceramics in reactions with iron)

IT 7439-89-6P, preparation

RL: PEP (Physical, engineering or chemical process); PREP (Preparation);  
PROC (Process)  
(formation of, in iron reaction in ceramics)

L1 ANSWER 2 OF 6 CA COPYRIGHT 2002 ACS  
AN 78:114443 CA  
TI Crystallization of metal powders obtained by liquid-phase pulverization  
AU Petrov, A. K.; Miroshnichenko, I. S.; Parabin, V. V.; Parabina, G. I.;  
Sergeev, G. N.; Orlov, Yu. G.; Golovko, V. A.; Brekharya, G. P.  
CS Ukr. Nauchno-Issled. Inst. Spets, Stalei, Splavov Ferrosplavov, USSR  
SO Porosh. Met. (1973), 13(1), 16-20  
CODEN: PMANAI  
DT Journal  
LA Russian  
CC 56-3 (Nonferrous Metals and Alloys)  
AB Crystn. of pulverized molten metals was studied with emphasis on the  
relation between the cooling rate and the formation of dendritic  
structures and the effect of crystn. parameters on the oxidn. of  
solidifying particles. Initial materials were molten R18 (Cr-W-V steel),  
Kh18N15 (Cr-Ni steel), El437B (ni-Cr alloy), and VK4A. Metallog,  
specimens were prepd. by compacting pulverized metal in brass casings, by  
mixing pulverized particles with a solidifying resin, and by pressing the  
power with pwd. Ni (1:4 ration). The last procedure made it possible to  
measure the oxide-layer thickness and to **etch** the specimens  
electrolytically. The structure of all the powders examd. is  
**dendritic** and strongly affected by the cooling rate, Vc. The  
distance between secondary **dendritic** branches can be used for  
characterizing Vc. This relation was confirmed by expts. with different  
metals that solidified over a broad cooling-rate range (10-107  
degrees/sec). When the dendritic parameter is plotted vs. Vc on a  
logarithmic scale, a linear dependence was found. This parameter is also  
dependent on the steel compn., but to a lesser extent. The mean thickness  
of the oxide layer on the surface of R18 particles decreases with Vc.  
Consequently, the oxidn. of pulverized particles takes place mainly during  
their crystn.; addnl. oxidn. of solid particles is negligible.  
ST metal powder crystn; steel alloy powder crystn; nickel alloy powder  
crystn; chromium alloy powder crystn; tungsten steel powder crystn;  
vanadium steel powder crystn  
IT Crystallization  
(of metal powders during atomization)  
IT Atomization  
(of metal powders, crystn. in)  
IT 12719-18-5 37188-51-5 37241-62-6 39391-97-4, uses and miscellaneous  
RL: USES (Uses)  
(atomization of, crystn. in)

L1 ANSWER 3 OF 6 CA COPYRIGHT 2002 ACS  
AN 69:81748 CA  
TI Method of **etching** silicon carbide  
IN Haga, Leigh J.; Tucker, Thomas N.  
PA Dow Corning Corp.  
SO U.S., 2 pp.  
CODEN: USXXAM  
DT Patent  
LA English  
NCL 156017000  
CC 71 (Electric Phenomena)  
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
US 3398033	A	19680820	US 1965-435674	19650226

AB A method of removing SiC from a Si surface by **etching** is  
described. The SiC is heated and then exposed to a halogen-O mixt. This  
mixt. causes deterioration of the SiC and tends to make it porous.

Treatment by HF-HNO<sub>3</sub> **etching** removes the remaining SiC from the Si after the SiC has become porous. E.g., a section of **dendritic** web Si crystal with a 1 mil SiC coating is placed in a reaction chamber and heated to 1200.degree.. An **etch** mixt. of Cl 25 and O 75 vol. % is fed into the chamber at 500 cc./min. for 2 hrs. The SiC layer at this point is deteriorated and porous. The surface is then treated with a mixt. of 1 part HF and 1 part HNO<sub>3</sub> to remove the remaining SiC.

ST **etching** Si carbides; carbides Si **etching**; silicon carbides **etching**

IT **Etching**

(of silicon carbide with halogen-oxygen mixts.)

IT 7782-44-7, reactions

RL: RCT (Reactant)

(**etching** of silicon carbide (SiC) with mixts. of chlorine and fluorine and)

IT 7782-41-4, reactions 7782-50-5, reactions

RL: RCT (Reactant)

(**etching** of silicon carbide (SiC) with mixts. of oxygen and)

IT 409-21-2, reactions

RL: RCT (Reactant)

(**etching** of, with halogen-oxygen mixts.)

L1 ANSWER 4 OF 6 CA COPYRIGHT 2002 ACS

AN 63:50719 CA

OREF 63:9210h,9211a

TI Transverse Hall coefficient and magnetoresistance of two-phase InSb-In layers

AU Wieder, H. H.; Davis, N. M.

CS U.S. Navy Ordnance Lab., Corona, CA

SO Solid-State Electron. (1965), 8(7), 605-10

DT Journal

LA English

CC 9 (Electric and Magnetic Phenomena)

AB The composite films recrystd. from the liquid phase are investigated as a function of the magnetic field before and after **etching**. The significance of the microgeometrical factors and the metallic inclusions is shown. The electron mobility in the InSb **dendrites** is estd. to be 3 .times. 10<sup>4</sup> cm.<sup>2</sup>/v.-sec. at 296.degree.K. Good agreement between theory and expt. is obtained.

L1 ANSWER 5 OF 6 CA COPYRIGHT 2002 ACS

AN 55:1887 CA

OREF 55:306i,307a-c

TI **Dendritic** segregation in medium-alloyed structural steels

AU Aleshin, D. V.

SO Met., Sbornik Statei (1958), (No. 1), 115-34

DT Journal

LA Unavailable

CC 9 (Metallurgy)

AB An app. was built for spectrographic microdetn. of Ni, Mn, Mo, etc., in segregates in steel ingots. Spark discharge (8-10 kv., 1000 cm.-0.01 .mu.f.) between 15-50-.mu. Pt or Cu wire and selected areas of the structure was used for excitation. The distance between the tip of the electrode and the specimen was 30 .mu.. The area of the specimen covered in the single detn. was .apprx.0.002 sq. mm. Cr 2663 and 2677, Ni 2416, and Mn 2933 A. lines were used. To facilitate the selection under a microscope of suitable portions of the specimen, **dendritic** structure was revealed by conventional **etching**, preceded by a heat-treatment in which transformation of austenite was stopped at the moment when it takes place only in the axes of dendrites. The detns. were carried out on open-hearth steels (duplex basic/acid) contg. Ni 2.5, Cr 1.9, and Mo 0.35%, and on standard- and vacuum-cast ingots for heavy rotors. With exptl. error of 4-6%, the av. contents of alloying elements in interstitial segregates and in axes of dendrites were found to be the

same in all parts of an ingot, except at the pipe. Differences of compn. in various parts of an ingot are only those between interstitial segregates and axes of dendrites. Segregation of C was evaluated indirectly by microhardness measurements and similar results were obtained.

L1 ANSWER 6 OF 6 CA COPYRIGHT 2002 ACS  
AN 50:933 CA  
OREF 50:145c-d  
TI The application of radiographic methods to the structure studies of magnesium alloys  
AU Drits, M. E.; Sviderskaya, Z. A.; Kadaner, E. S.  
SO Zavodskaya Lab. (1955), 21, 831-3  
DT Journal  
LA Unavailable  
CC 9 (Metallurgy and Metallography)  
AB The structure of Mg alloys was studied after the addn. of small amts. of a Ca isotope to the alloy, because the **dendritic** structure of Mg could not be revealed by **etching**.

=> s calix? and etch?  
4628 CALIX?  
157940 ETCH?  
L2 30 CALIX? AND ETCH?

=> s l2 not l1  
L3 30 L2 NOT L1

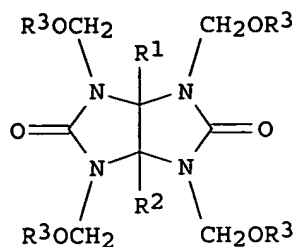
=> d all 1=30  
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=> d all 1-30

L3 ANSWER 1 OF 30 CA COPYRIGHT 2002 ACS  
AN 136:191684 CA  
TI Negative photoresist composition containing dendrimer and formation of photoresist pattern using it  
IN Afzali, Ardakani Ali; Breen, Tricia L.; Gelorme, Jeffrey Donald; Mitzi, David Brian; Lux, Michael Joseph  
PA International Business Machines Corp., USA  
SO Jpn. Kokai Tokkyo Koho, 12 pp.  
CODEN: JKXXAF  
DT Patent  
LA Japanese  
IC ICM G03F007-038  
ICS H01L021-027  
CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2002049152	A2	20020215	JP 2001-164184	20010531
PRAI	US 2000-208269P	P	20000531		
	US 2000-685414	A	20001010		
OS	MARPAT 136:191684				
GI					



I

- AB The photoresist compn. comprises (1) aliph. dendrimer having .gtoreq.8 OH groups per mol., (2) glycoluril deriv. as crosslinker, (3) photoacid generator, and (4) org. solvent. Preferably, the dendrimer is **calix** [4]arene dendrimer deriv., the glycoluril deriv. has a general formula I (R1-2 = H, C1-6 alkyl, alkenyl, alkoxy, aryl; R3 = alkoxy), and the photoacid generator is onium salt. Photoresist pattern is formed by applying the compn. on a substrate, exposing to E-beam energy, baking, and developing with org. solvent. The resulting photoresist pattern is useful for **etching** semiconductors, ceramics, org. compds., and metals. The compn. has high sensitivity and resolu.
- ST neg photoresist dendrimer glycoluril deriv onium salt; sensitivity resolu
- neg photoresist **calix** arene dendrimer
- IT Ceramics
- Negative photoresists
- Semiconductor materials
- (solvent-developable neg. photoresist compn. contg. dendrimer, glycoluril deriv., and photoacid generator for high sensitivity and resolu.)
- IT Dendritic polymers
- RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
- (solvent-developable neg. photoresist compn. contg. dendrimer, glycoluril deriv., and photoacid generator for high sensitivity and resolu.)
- IT Metals, processes
- RL: PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process)
- (solvent-developable neg. photoresist compn. contg. dendrimer, glycoluril deriv., and photoacid generator for high sensitivity and resolu.)
- IT 57840-38-7, Triphenylsulfonium hexafluoroantimonate
- RL: TEM (Technical or engineered material use); USES (Uses)
- (UV 16974, photoacid generator; solvent-developable neg. photoresist compn. contg. dendrimer, glycoluril deriv., and photoacid generator for high sensitivity and resolu.)
- IT 399037-47-9, 4-t-Butylcalix [4]arene-dimethylolpropionic acid copolymer
- RL: TEM (Technical or engineered material use); USES (Uses)
- (dendritic; solvent-developable neg. photoresist compn. contg. dendrimer, glycoluril deriv., and photoacid generator for high sensitivity and resolu.)
- IT 71443-52-2P
- RL: IMF (Industrial manufacture); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
- (solvent-developable neg. photoresist compn. contg. dendrimer, glycoluril deriv., and photoacid generator for high sensitivity and resolu.)
- IT 16837-14-2P
- RL: PNU (Preparation, unclassified); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)

(solvent-developable neg. photoresist compn. contg. dendrimer, glycoluril deriv., and photoacid generator for high sensitivity and resoln.)

IT 50-00-0, Formaldehyde, reactions 57-13-6, Urea, reactions 3848-24-6, 2,3-Hexanedione 4767-03-7 123830-85-3, Dimethoxypropane  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (solvent-developable neg. photoresist compn. contg. dendrimer, glycoluril deriv., and photoacid generator for high sensitivity and resoln.)

IT 220140-29-4  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (solvent-developable neg. photoresist compn. contg. dendrimer, glycoluril deriv., and photoacid generator for high sensitivity and resoln.)

L3 ANSWER 2 OF 30 CA COPYRIGHT 2002 ACS  
 AN 135:303868 CA  
 TI Syntheses and metal-ion binding properties of **calix[4]arene** derivatives containing soft donor atoms: highly selective extraction reagents for Ag<sup>+</sup>  
 AU Xie, Jian; Zheng, Qi-Yu; Zheng, Yan-Song; Chen, Chuan-Feng; Huang, Zhi-Tang  
 CS LMRSS, Center for Molecular Science, Institute of Chemistry, The Chinese Academy of Sciences, Beijing, 100080, Peop. Rep. China  
 SO Journal of Inclusion Phenomena and Macrocyclic Chemistry (2001), 40(1-2), 125-130  
 CODEN: JIPCF5  
 PB Kluwer Academic Publishers  
 DT Journal  
 LA English  
 CC 28-23 (Heterocyclic Compounds (More Than One Hetero Atom))  
 Section cross-reference(s): 68  
 OS CASREACT 135:303868  
 GI

\* STRUCTURE DIAGRAM TOO LARGE FOR DISPLAY - AVAILABLE VIA OFFLINE PRINT \*

AB **Calix[4]arene** derivs. such as I and II (R = **EtCH<sub>2</sub>S**) contg. N or S atoms at the lower rim were prepd. E.g., di(2-bromoethyl) **calixarene** II (R = Br) was refluxed with 1,3-propanedithiol in a 2:1 mixt. of benzene and DMF for 4h with potassium hydroxide as the base to give I in 87% yield. All of the receptors prepd. were highly selective for silver ion over other metal ions. The **calix[4]arene** podand II (R = **EtCH<sub>2</sub>S**) bound Ag<sup>+</sup> more strongly than the **calix[4]crown** ligands such as I.

ST **calixcrown calixarene** podand ligand prepn selective extn silver; complexation extn metal ion **calixcrown calixarene** podand ligand; selective complexation silver **calixcrown calixarene** podand

IT Metacyclophanes  
 RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
 (**calixarenes**; prepn. and metal ion complexation selectivity of **calixarene** thiacycrown and podand derivs. as ligands for the selective complexation of silver)

IT Metacyclophanes  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
 (crown ethers; prepn. and metal ion complexation selectivity of **calixarene** thiacycrown and podand derivs. as ligands for the selective complexation of silver)

IT Crown ethers

RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(metacyclophanes; prepn. and metal ion complexation selectivity of  
**calixarene** thiacycrown and podand derivs. as ligands for the  
selective complexation of silver)

IT Complexation  
(prepn. and metal ion complexation selectivity of **calixarene**  
thiacycrown and podand derivs. as ligands for the selective complexation  
of silver)

IT Macrocyclic compounds  
RL: PRP (Properties)  
(prepn. and metal ion complexation selectivity of **calixarene**  
thiacycrown and podand derivs. as ligands for the selective complexation  
of silver)

IT 7439-89-6, Iron, properties 7439-96-5, Manganese, properties  
7439-97-6, Mercury, properties 7440-09-7, Potassium, properties  
7440-22-4, Silver, properties 7440-28-0, Thallium, properties  
7440-43-9, Cadmium, properties 7440-48-4, Cobalt, properties  
7440-50-8, Copper, properties 7440-66-6, Zinc, properties 7440-70-2,  
Calcium, properties 223911-14-6 223911-20-4 223911-21-5  
RL: PRP (Properties)  
(prepn. and metal ion complexation selectivity of **calixarene**  
thiacycrown and podand derivs. as ligands for the selective complexation  
of silver)

IT 197228-56-1P 367279-78-5P 367279-79-6P  
RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
(prepn. and metal ion complexation selectivity of **calixarene**  
thiacycrown and podand derivs. as ligands for the selective complexation  
of silver)

IT 107-03-9, 1-Propanethiol 109-64-8, 1,3-Dibromopropane 109-80-8,  
1,3-Propanedithiol 60705-62-6 197228-58-3  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(prepn. and metal ion complexation selectivity of **calixarene**  
thiacycrown and podand derivs. as ligands for the selective complexation  
of silver)

IT 213924-21-1P  
RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT  
(Reactant or reagent)  
(prepn. and metal ion complexation selectivity of **calixarene**  
thiacycrown and podand derivs. as ligands for the selective complexation  
of silver)

RE.CNT 29 THERE ARE 29 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L3 ANSWER 3 OF 30 CA COPYRIGHT 2002 ACS

AN 135:203004 CA

TI Post-development resist hardening by vapor silylation

IN Aviram, Ari; Rooks, Michael Joseph

PA International Business Machines Corp., USA

SO U.S., 7 pp.

CODEN: USXXAM

DT Patent

LA English

IC ICM G03F007-26

NCL 430314000

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

Section cross-reference(s): 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6280908	B1	20010828	US 1999-292727	19990415
AB	The invention provides a method of reducing the <b>etch</b> rate of a patterned resist on a substrate by treating the patterned resist with an atm. comprising the mols. of a hardening agent. Specifically, the method employed by the present invention comprises applying a layer of an imageable resist to a substrate layer; patterning the layer of imageable resist by removing selective areas thereof; and treating the patterned imageable resist with an atm. comprising mols. of a hardening agent so as to obtain a hardened resist surface which <b>etches</b> at a slower rate than that of the untreated resist.				
ST	resist hardening vapor silylation methyl acetoxycalixarene hexamethyl disilazane				
IT	<b>Etching</b> kinetics (in CF <sub>4</sub> plasma, of methylacetoxycalixarene resist film hardened by vapor silylation using hexamethyldisilazane)				
IT	Resists (pos.-tone; post-development resist hardening of methylacetoxycalixarene by vapor silylation using hexamethyldisilazane)				
IT	Silylation Surface hardening (post-development resist hardening of methylacetoxycalixarene by vapor silylation using hexamethyldisilazane)				
IT	141137-71-5 RL: DEV (Device component use); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses) (post-development resist hardening by vapor silylation of)				
IT	999-97-3, HMDS RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent); USES (Uses) (post-development resist hardening of methylacetoxycalixarene by vapor silylation using)				
IT	7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-95-4, Magnesium, uses 7440-02-0, Nickel, uses 7440-05-3, Palladium, uses 7440-06-4, Platinum, uses 7440-16-6, Rhodium, uses 7440-18-8, Ruthenium, uses 7440-32-6, Titanium, uses 7440-38-2, Arsenic, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-57-5, Gold, uses 7440-67-7,				

Zirconium, uses 7440-70-2, Calcium, uses  
RL: DEV (Device component use); MOA (Modifier or additive use); USES  
(Uses)  
(post-development resist hardening of methylacetoxycalixarene using  
metalloid or metallic element)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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Microlithography, Micromachining and Microfabrication vol 1:  
Microlithography 1997
- (5) Sato; US 5756255 1998 CA

L3 ANSWER 4 OF 30 CA COPYRIGHT 2002 ACS

AN 135:53439 CA

TI Microcontact printing with heavyweight inks

AU Liebau, Maik; Huskens, Jurriaan; Reinhoudt, David N.

CS Laboratory of Supramolecular Chemistry and Technology, MESA+ Research  
Institute, University of Twente, Enschede, NL-7500 AE, Neth.

SO Advanced Functional Materials (2001), 11(2), 147-150

CODEN: AFMDC6; ISSN: 1616-301X

PB Wiley-VCH Verlag GmbH

DT Journal

LA English

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other  
Reprographic Processes)

AB Thioether derivs. with thioether moieties were used as inks in  
microcontact printing on gold for the reprodn. of patterns as they combine  
good monolayer quality with synthetic versatility, and high mol. wts.  
Self-assembled monolayers (SAMs) on gold of **calixarene**- and  
cavitand tetra(thioether) compds. (1 and 2 resp.) had a quality comparable  
to SAMs of decanethiol, both regarding monolayer order and **etch**  
resistance. **Etch** resistances of SAMs of tris(thioether) deriv.  
and dodecylsulfide (3 and 4 resp.) were lower. Resulting structures after  
**etching** of patterned SAMs using 1, 2, and 3 were of good quality  
for patterns with feature sizes on the same stamp ranging from 1-200  
.mu.m. Patterns of 4 were not reproduced. Overall, compds. 1 and 2 are  
good candidates for low-diffusion inks.

ST lithog microcontact printing thioether deriv self assembled layer;  
**calixarene** thioether deriv self assembled layer lithog  
microcontact printing

IT Metacyclophanes

RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(**calixarenes**; **etch** resistance and imaging  
properties of self-assembled monolayers of thioether derivs. in  
microcontact printing of gold surfaces)

IT Electric capacitance

Electric resistance

(electrochem.- and imaging properties of self-assembled monolayers of  
thioether derivs. in microcontact printing of gold surfaces)

IT Contact angle

Self-assembled monolayers

(**etch** resistance and imaging properties of self-assembled  
monolayers of thioether derivs. in microcontact printing of gold  
surfaces)

IT Thioethers

RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(**etch** resistance and imaging properties of self-assembled  
monolayers of thioether derivs. in microcontact printing of gold  
surfaces)

IT Lithography

(microcontact printing; **etch** resistance and imaging

properties of self-assembled monolayers of thioether derivs. in microcontact printing of gold surfaces)

IT 693-83-4, Didecyl sulfide  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (comparison; etch resistance and imaging properties of self-assembled monolayers of thioether derivs. in microcontact printing of gold surfaces)

IT 7440-57-5, Gold, processes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (etch resistance and imaging properties of self-assembled monolayers of thioether derivs. in microcontact printing of gold surfaces)

IT 155401-92-6 167424-00-2 345196-83-0  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
 (etch resistance and imaging properties of self-assembled monolayers of thioether derivs. in microcontact printing of gold surfaces)

IT 1310-58-3, Potassium hydroxide, uses 7772-98-7, Sodium thiosulfate 13943-58-3, Tetrapotassium hexacyanoferrate  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (etchant; etch resistance and imaging properties of self-assembled monolayers of thioether derivs. in microcontact printing of gold surfaces)

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L3 ANSWER 5 OF 30 CA COPYRIGHT 2002 ACS

AN 134:229590 CA

TI Comparative study of sputtered and spin-coatable aluminum oxide electron beam resists

AU Saifullah, M. S. M.; Kurihara, K.; Humphreys, C. J.

CS Nanoscale Science Group, Department of Engineering, University of Cambridge, Cambridge, CB2 1PZ, UK

SO Journal of Vacuum Science & Technology, B: Microelectronics and Nanometer Structures (2000), 18(6), 2737-2744  
 CODEN: JVTBD9; ISSN: 0734-211X

PB American Institute of Physics

DT Journal

LA English

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

AB The electron beam exposure characteristics of sputtered AlOx and spin-coatable Al2O3 resists are compared and contrasted. When exposed to an electron beam, sputtered AlOx resists on a silicon substrate undergo an intense mass loss. However, electron energy loss spectroscopy shows that

even after a prolonged exposure some aluminum and oxygen remains on the silicon surface. Spin-coatable Al<sub>2</sub>O<sub>3</sub> resist was prepd. by reacting aluminum tri-sec-butoxide, Al(OBus)<sub>3</sub>, with acetylacetone (AcAc) in iso-Pr alc. These are neg. tone resists and they are >10<sup>6</sup> times more sensitive to an electron beam than the sputtered AlOx, bringing its sensitivity very close to high resolu. org. resists such as calixarene. The exposure properties of spin-coatable and sputtered aluminum oxide resists are discussed together with their sensitivity, damage mechanisms, line edge roughness, and etching characteristics. A brief note on the change of methodol. of resist design is added when inorg. resists are to be used in high resolu. electron beam nanolithog.

- ST sputtered spin coated aluminum oxide lithog electron beam resist
- IT Electron beam resists
- Electron radiolysis
- (comparison of lithog. characteristics of sputtered and spin-coated aluminum oxide electron-beam resists)
- IT Electron beams
- IR spectra
- (lithog. characteristics of spin coated aluminum oxide electron-beam resist prepd. from reaction of aluminum butoxide with acetylacetone)
- IT 123-54-6, Acetylacetone, uses
- RL: NUU (Other use, unclassified); USES (Uses)
- (comparison of lithog. characteristics of sputtered and spin-coated aluminum oxide electron-beam resists)
- IT 1344-28-1, Aluminum oxide, properties
- RL: PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
- (comparison of lithog. characteristics of sputtered and spin-coated aluminum oxide electron-beam resists)
- IT 2269-22-9, Aluminum tri-sec-butoxide
- RL: NUU (Other use, unclassified); USES (Uses)
- (lithog. characteristics of spin coated aluminum oxide electron-beam resist prepd. from reaction of aluminum butoxide with acetylacetone)

RE.CNT 30 THERE ARE 30 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L3 ANSWER 6 OF 30 CA COPYRIGHT 2002 ACS  
AN 134:23509 CA  
TI Method for pattern formation using **calix**[7]arene for  
semiconductor substrate  
IN Shinko, Sachiko; Ochiai, Yukinori; Yamamoto, Hiromasa; Tejima, Takahiro  
PA NEC Corp., Japan; Tokuyama Corp.  
SO Jpn. Kokai Tokkyo Koho, 7 pp.  
CODEN: JKXXAF  
DT Patent  
LA Japanese  
IC ICM G03F007-038  
ICS H01L021-027  
CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other  
Reprographic Processes)  
Section cross-reference(s): 76

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2000330281	A2	20001130	JP 1999-144369	19990525
AB	The title method includes the steps of: (1) forming a thin layer on a substrate using a coating soln. mainly made of <b>calix</b> [7]arene; (2) forming a latent image on the thin layer using a high energy beam; and (3) selectively <b>etching</b> -off the thin layer except the latent image part to form a pattern. The method using <b>calix</b> [7]arene provides a pattern of the reduced pattern roughness.				
ST	pattern formation resist semiconductor substrate <b>calixarene</b>				
IT	Metacyclophanes				
	RL: TEM (Technical or engineered material use); USES (Uses) ( <b>calixarenes</b> ; light sensitive compn. for semiconductor substrate prodn.)				
IT	Photoresists				
	Semiconductor device fabrication (method for pattern formation for semiconductor substrate)				
IT	50-00-0, Formaldehyde, reactions 106-44-5, p-Cresol, reactions 108-24-7, Acetic anhydride				
	RL: RCT (Reactant); RACT (Reactant or reagent) ( <b>calixarene</b> in light-sensitive resist compn.)				
IT	141137-71-5P, p-Methylhexaacetoxycalix[6]arene 196408-88-5P, p-Methylheptaacetoxycalix[7]arene 196408-89-6P, p- Methyloctaacetoxycalix[8]arene				
	RL: SPN (Synthetic preparation); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses) ( <b>calixarene</b> in light-sensitive resist compn.)				

L3 ANSWER 7 OF 30 CA COPYRIGHT 2002 ACS  
AN 133:245618 CA  
TI A comparison between the complexant alkaline **etching** systems of  
silicon  
AU Moldovan, Carmen; Iosub, Rodica; Dascalu, Dan; Mrin, Gheorghe; Danila,  
Carmen  
CS Natl. Inst. R&D Microtechnol., Bucharest, Rom.  
SO CAS '99 Proceedings, International Semiconductor Conference, 22nd, Sinaia,  
Romania, Oct. 5-9, 1999 (1999), Volume 1, 205-208 Publisher: Institute of  
Electrical and Electronics Engineers, New York, N. Y.  
CODEN: 69ADUW  
DT Conference  
LA English  
CC 76-3 (Electric Phenomena)  
AB This paper contains the results obtained in silicon hillock elimination  
using alk. solns.: KOH, NaOH, LiOH - H2O with complexant added. The  
complexant added in alk. solns. is Azo **calix**[4]arene. The alk.

solns. were compared and analyzed with and without complexant added, in point of view of hillocks and the behavior of these solns. is explained using the theory of molar cond. The results allow the authors to use the alk. solns. and the org. complexant, to monitor the **etching** process, to obtain a smooth silicon surface, almost free of hillocks.

ST alk **etching** systems silicon surface; alkali metal hydroxide **etching** system silicon surface

IT Semiconductor materials

Surface structure

(a comparison between the complexant alk. **etching** systems of silicon)

IT Alkali metal hydroxides

RL: RCT (Reactant); RACT (Reactant or reagent)

(a comparison between the complexant alk. **etching** systems of silicon)

IT 7440-21-3P, Silicon, properties

RL: DEV (Device component use); PNU (Preparation, unclassified); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(a comparison between the complexant alk. **etching** systems of silicon)

IT 221181-37-9D, salts

RL: FMU (Formation, unclassified); PRP (Properties); RCT (Reactant); FORM (Formation, nonpreparative); RACT (Reactant or reagent)

(a comparison between the complexant alk. **etching** systems of silicon)

IT 1310-58-3, Potassium hydroxide (KOH), reactions 1310-65-2, Lithium hydroxide (LiOH) 1310-73-2, Sodium hydroxide (NaOH), reactions

RL: RCT (Reactant); RACT (Reactant or reagent)

(a comparison between the complexant alk. **etching** systems of silicon)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L3 ANSWER 8 OF 30 CA COPYRIGHT 2002 ACS

AN 133:244989 CA

TI Nanometer-scale resolution of a chloromethylated **calixarene**

negative resist in electron-beam lithography: Dependence on the number of phenolic residues

AU Sakamoto, T.; Manako, S.; Fujita, J.; Ochiai, Y.; Baba, T.; Yamamoto, H.; Teshima, T.

CS Fundamental Research Laboratories, NEC Corporation, Tsukuba, Ibaraki, 305-8501, Japan

SO Applied Physics Letters (2000), 77(2), 301-303

CODEN: APPLAB; ISSN: 0003-6951

PB American Institute of Physics

DT Journal

LA English

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

AB We have investigated a chloromethylated **calixarene**,

p-chloromethylmethoxycalix[n]arene (CMC[n]AOMe) (n=5,6,7), as a neg. resist in electron-beam lithog. Each CMC[n]AOMe resist has a resolu. of about 12 nm and a sensitivity of about 0.8 mC/cm<sup>2</sup> which varies slightly with n (or mol. wt.). A sub-10-nm Si wire has been fabricated by halide plasma **etching** and a CMC[n]AOMe resist as an **etching** mask.

Because the resist pattern edge is smooth, Si wires with 7-nm width and 10-.mu.m length were performed without any breaking.

ST chloromethylated **calixarene** electron beam resist; lithog  
electron beam **etching** mask

IT Electron beam lithography  
Electron beam resists  
**Etching**  
**Etching** masks  
(nanometer-scale resoln. of chloromethylated **calixarene** neg.  
resist in electron-beam lithog.: Dependence on no. of phenolic  
residues)

IT 7440-21-3, Silicon, processes  
RL: DEV (Device component use); PEP (Physical, engineering or chemical  
process); PROC (Process); USES (Uses)  
(nanometer-scale resoln. of chloromethylated **calixarene** neg.  
resist in electron-beam lithog.: Dependence on no. of phenolic  
residues)

RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L3 ANSWER 9 OF 30 CA COPYRIGHT 2002 ACS

AN 133:176912 CA

TI conformational rigidity in mesitylene-based **calix**[4]arenes  
adopting a 1,3-alternate conformation

AU Parzuchowski, P.; Bohmer, V.; Biali, S. E.; Thondorf, I.

CS ul. Noakowskiego 3, Faculty of Chemistry, Warsaw University of Technology,  
Warsaw, PL-00664, Pol.

SO Tetrahedron: Asymmetry (2000), 11(11), 2393-2402  
CODEN: TASYE3; ISSN: 0957-4166

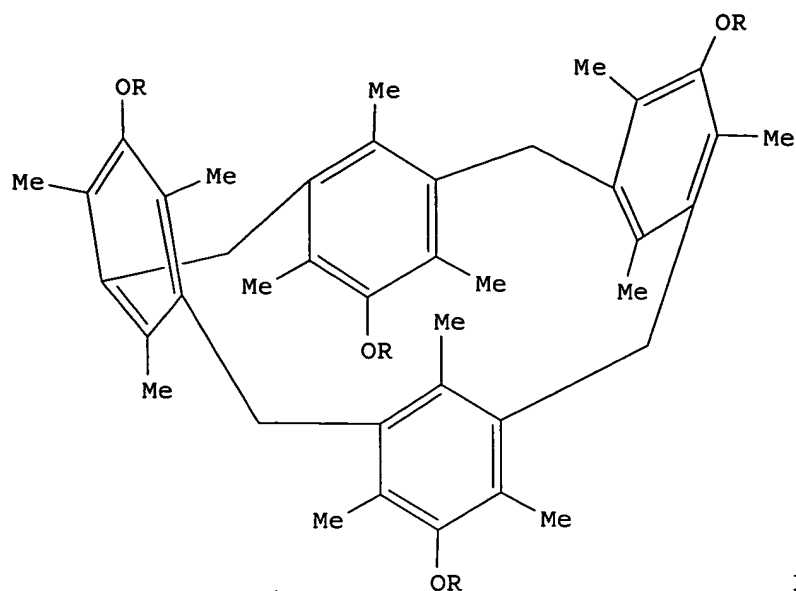
PB Elsevier Science Ltd.

DT Journal

LA English

CC 22-10 (Physical Organic Chemistry)

GI



- AB Two chiral derivs. of a mesitylene-based **calix**[4]arene (I; R= **EtCHMeCH<sub>2</sub>**, PhCHMeNHCOCH<sub>2</sub>) known to exist in the 1,3-alternate conformation were prepd. by the attachment of homochiral residues to the four exo-hydroxy groups. Thus, the enantiotopic protons of the central scaffold became diastereotopic, leading to a doubling of their <sup>1</sup>H NMR signals in one example. From the temp. independence of the NMR spectrum, a lower limit of 24.2 kcal/mol could be estd. for the barrier of ring inversion. MM3 calcns. confirm the 1,3-alternate conformation as the energy min., and est. a barrier of 25.7 kcal/mol for the 1,3-alternate-to-1,3-alternate\* interconversion process. This high barrier is due to the repulsive steric interactions between exo-Me groups at vicinal rings when these groups pass each other.
- ST NMR conformation **calixarene** chiral mesitylene based; rotational barrier **calixarene** chiral mesitylene based NMR
- IT Steric hindrance  
Strain energy  
(Me group; NMR study of conformational rigidity in mesitylene-based **calix**[4]arenes adopting a 1,3-alternate conformation)
- IT Chirality  
Conformation  
Conformational potential  
Conformational transition  
Molecular mechanics  
NMR (nuclear magnetic resonance)  
Rotational barrier  
(NMR study of conformational rigidity in mesitylene-based **calix**[4]arenes adopting a 1,3-alternate conformation)
- IT Metacyclophanes  
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
(**calixarenes**; NMR study of conformational rigidity in mesitylene-based **calix**[4]arenes adopting a 1,3-alternate conformation)
- IT Conformers  
(low energy; NMR study of conformational rigidity in mesitylene-based **calix**[4]arenes adopting a 1,3-alternate conformation)
- IT Methyl group  
(steric interaction; NMR study of conformational rigidity in mesitylene-based **calix**[4]arenes adopting a 1,3-alternate conformation)



IT 121702-02-1 149703-31-1 157432-87-6 288301-95-1 288302-11-4  
 288302-12-5 288302-13-6 288302-14-7 288302-15-8 288302-16-9  
 288302-17-0 288302-18-1  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties);  
 PROC (Process)  
 (NMR study of conformational rigidity in mesitylene-based calix  
 [4]arenes adopting a 1,3-alternate conformation)

IT 288301-93-9P 288301-94-0P  
 RL: PEP (Physical, engineering or chemical process); PRP (Properties); SPN  
 (Synthetic preparation); PREP (Preparation); PROC (Process)  
 (NMR study of conformational rigidity in mesitylene-based calix  
 [4]arenes adopting a 1,3-alternate conformation)

IT 534-00-9, (S)-(+)-1-Bromo-2-methylbutane 2627-86-3, (S)-(-)-1-  
 Phenylethylamine 201489-72-7  
 RL: RCT (Reactant); RACT (Reactant or reagent)  
 (prepn. of chiral derivs. of a mesitylene-based calix  
 [4]arene)

IT 212835-17-1P  
 RL: RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT  
 (Reactant or reagent)  
 (prepn. of chiral derivs. of a mesitylene-based calix  
 [4]arene)

RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD

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L3 ANSWER 10 OF 30 CA COPYRIGHT 2002 ACS

AN 133:170174 CA

TI Electron beam lithography of Fresnel zone plates using a rectilinear  
 machine and trilayer resists

AU Tennant, D.; Spector, S.; Stein, A.; Jacobsen, C.

CS Lucent Technologies Bell Laboratories, USA

SO AIP Conference Proceedings (2000), 507(X-Ray Microscopy), 601-606  
 CODEN: APCPCS; ISSN: 0094-243X

PB American Institute of Physics

DT Journal

LA English

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other  
 Reprographic Processes)

Section cross-reference(s): 73

AB The authors describe the use of a com. e-beam lithog. system (JEOL  
 JBX-6000FS) to fabricate Fresnel zone plates for x-ray microscopy. The  
 machine is capable of controlling the pitch of optical gratings with  
 sub-nanometer precision, so its beam placement properties are more than  
 adequate for zone plate fabrication. The zone plate pattern is written  
 into a thin top layer (PMMA or Calixarene) of a trilayer resist,

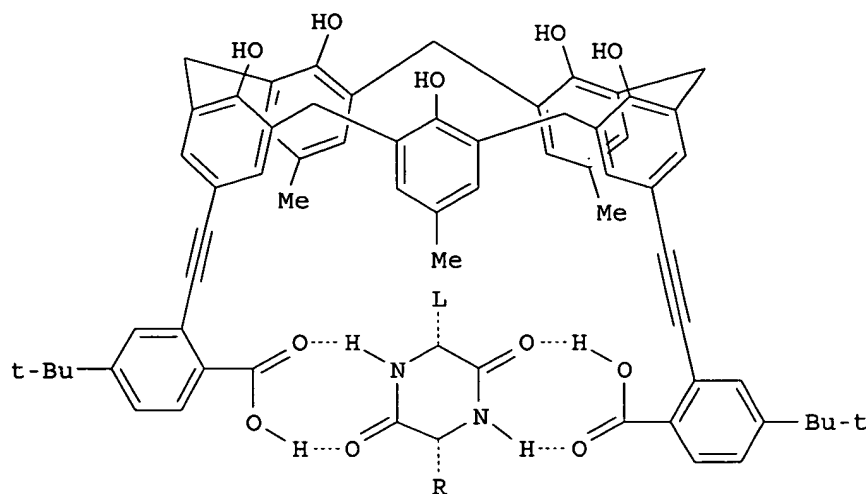
and transferred into thick nickel zones using reactive ion etching (RIE) followed by electroplating. Zone plates with outermost zone widths of 30 nm have exhibited efficiencies up to 10.0% at a 390 eV photon energy and with diams. in the range 80 to 120  $\mu\text{m}$ . Zone plates with outer zones of 18 to 20 nm were also fabricated in thinner Ni with correspondingly lower efficiencies of 2.6%. Zone plates with outermost zone widths of 45 nm have been fabricated with larger diams. up to 160  $\mu\text{m}$ . All results reported were obtained with a 50 kV system with 80  $\mu\text{m}$  field deflection size; future efforts will make use of a 100 kV, 500  $\mu\text{m}$  field size system.

- ST Fresnel zone plate fabrication electron beam lithog
- IT Metacyclophanes
  - RL: TEM (Technical or engineered material use); USES (Uses)
  - (calixarenes; electron beam lithog. fabrication of Fresnel zone plates for x-ray microscopy using rectilinear machine and trilayer resists)
- IT Electron beam lithography
  - Electron beam resists
  - X-ray microscopy
  - (electron beam lithog. fabrication of Fresnel zone plates for x-ray microscopy using rectilinear machine and trilayer resists)
- IT Optical instruments
  - (zone plates, Fresnel; electron beam lithog. fabrication of Fresnel zone plates for x-ray microscopy using rectilinear machine and trilayer resists)
- IT 89072-52-6, AZ 4110
  - RL: NUU (Other use, unclassified); USES (Uses)
  - (AZ 4110; electron beam lithog. fabrication of Fresnel zone plates for x-ray microscopy using rectilinear machine and trilayer resists)
- IT 7440-02-0, Nickel, processes 7440-47-3, Chrome, processes 7440-57-5, Gold, processes
  - RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
  - (electron beam lithog. fabrication of Fresnel zone plates for x-ray microscopy using rectilinear machine and trilayer resists)
- IT 7440-56-4, Germanium, uses 9011-14-7, PMMA
  - RL: NUU (Other use, unclassified); USES (Uses)
  - (electron beam lithog. fabrication of Fresnel zone plates for x-ray microscopy using rectilinear machine and trilayer resists)
- IT 75-25-2, Tribromomethane
  - RL: NUU (Other use, unclassified); USES (Uses)
  - (plasma etch; electron beam lithog. fabrication of Fresnel zone plates for x-ray microscopy using rectilinear machine and trilayer resists)

RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD  
RE

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- (2) Feser, M; Instrumentation advances and detector development with the Stony Brook scanning transmission x-ray microscope These proceedings
- (3) Fujita, J; Applied Physics Letters 1996, V68, P1297 CA
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- (5) Kyser, D; Journal of Vacuum Science and Technology B 1983, V1, P1391 CA
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- (11) Tennant, D; Journal of Vacuum Science and Technology 1981, V19, P1304 CA
- (12) Tennant, D; Journal of Vacuum Science and Technology 1993, VB 11(6), P2509
- (13) Wang, Y; Journal of Microscopy (in press)

AN 133:134995 CA  
 TI Non-directional forces drive guest affinity and discrimination in a  
 calix[5]arene-based receptor  
 AU Haino, Takeharu; Nitta, Koji; Fukazawa, Yoshimasa  
 CS Department of Chemistry, Graduate School of Science, Hiroshima University,  
 Higashi-Hiroshima, 739-8526, Japan  
 SO Tetrahedron Letters (2000), 41(21), 4139-4142  
 CODEN: TELEAY; ISSN: 0040-4039  
 PB Elsevier Science Ltd.  
 DT Journal  
 LA English  
 CC 22-10 (Physical Organic Chemistry)  
 GI



AB In this paper we report the binding behavior of a receptor based on a  
 calix[5]arene possessing two convergent benzoic acids that serve  
 to bind a guest . The receptor recognizes diketopiperazines (DKP) having  
 a variety of alkyl substituents to form a 1:1 host-guest complex (I; R=  
 Me, Me<sub>2</sub>CH, EtCHMe, Me<sub>2</sub>CHCH<sub>2</sub>, Me<sub>3</sub>C, MeSCH<sub>2</sub>CH<sub>2</sub>, PhCH<sub>2</sub>). We demonstrate  
 that the receptor shows selectivity for the DKPs based on the size of the  
 alkyl substituent. As a result, the selectivity arises from  
 non-directional forces between the .pi.-basic arom. ring of the  
 calixarene and the alkyl group of the guest.  
 ST calixarene receptor diketopiperazine guest affinity NMR mol  
 mechanics; assocn const calixarene receptor diketopiperazine  
 guest  
 IT Formation constant  
 Hydrogen bond  
 Molecular mechanics  
 Molecular modeling  
 NMR (nuclear magnetic resonance)  
 Van der Waals force  
 (NMR and mol. mechanics study of guest affinity and discrimination in  
 calix[5]arene-based receptor)  
 IT Molar volume  
 Molecular shape  
 (alkyl group; NMR and mol. mechanics study of guest affinity and  
 discrimination in calix[5]arene-based receptor)  
 IT Metacyclophanes  
 RL: PEP (Physical, engineering or chemical process); PROC (Process)  
 (calixarenes; NMR and mol. mechanics study of guest affinity  
 and discrimination in calix[5]arene-based receptor)

IT Solvation  
 (model; NMR and mol. mechanics study of guest affinity and discrimination in **calix[5]arene**-based receptor)

IT Force  
 (nondirectional; NMR and mol. mechanics study of guest affinity and discrimination in **calix[5]arene**-based receptor)

IT Alkyl groups  
 (shape anal.; NMR and mol. mechanics study of guest affinity and discrimination in **calix[5]arene**-based receptor)

IT 286856-03-9P 286856-04-0P 286856-05-1P 286856-06-2P 286856-08-4P  
 286856-10-8P 286856-11-9P  
 RL: PRP (Properties); SPN (Synthetic preparation); PREP (Preparation)  
 (NMR and mol. mechanics study of guest affinity and discrimination in **calix[5]arene**-based receptor)

RE.CNT 23 THERE ARE 23 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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- (4) Connors, K; Binding Constants 1987
- (5) Goodman, M; J Am Chem Soc 1995, V117, P8447 CA
- (6) Haino, T; Angew Chem, Int Ed 1998, V37, P997 CA
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- (10) Haino, T; Tetrahedron Lett 1995, V36, P5793 CA
- (11) Haino, T; Tetrahedron Lett 1998, V39, P8133 CA
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- (13) Kelly-Rowley, A; J Am Chem Soc 1995, V117, P3438 CA
- (14) Kolossvary, I; J Am Chem Soc 1996, V118, P5011 CA
- (15) Leggett, D; Modern Inorganic Chemistry Series 1985
- (16) Lehn, J; Supramolecular Chemistry 1995
- (17) Mohamadi, F; J Comp Chem 1990, V11, P440 CA
- (18) Nicholls, A; Proteins 1991, V11, P281 CA
- (19) Perreault, D; Tetrahedron 1995, V51, P353
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- (22) Szabo, T; Angew Chem, Int Ed 1998, V37, P3410 CA
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L3 ANSWER 12 OF 30 CA COPYRIGHT 2002 ACS

AN 132:257193 CA

TI Aspects concerning chemical and electrochemical reactivity of some synthesized **calixarenes**

AU Ungureanu, Eleonora-Mihaela; Nechifor, G.; Pirvu, C.; Serban, B.

CS Department of Industrial Chemistry, University "Politehnica" of Bucharest, Rom.

SO Scientific Bulletin - University "Politehnica" of Bucharest, Series B: Chemistry and Materials Science (1999), 61(1-2), 55-65  
 CODEN: SBUPBD; ISSN: 1454-2331

PB University "Politehnica" of Bucharest

DT Journal

LA English

CC 72-2 (Electrochemistry)

Section cross-reference(s): 22, 25, 66, 76

AB Study of electrochem. properties of newly synthesized **calix[4]arenes** and the silicon **etching** in basic medium in the presence of these **calixarenes** are described.

ST electrochem chem reactivity **calixarene** prepn; silicon anisotropic **etching** alk soln **calixarene** complexant; electroredn **calixarene** glassy carbon platinum electrode; electrooxidn **calixarene** glassy carbon platinum electrode; cyclic voltammetry **calixarene** glassy carbon platinum electrode

IT **Etching**

(anisotropic; of silicon in alk. soln. contg. **calixarene** sulfophenylazo deriv. complexant)

IT Reactivity (chemical)  
(chem. and electrochem. reactivity of synthesized **calixarenes**)

IT Cyclic voltammetry  
Oxidation, electrochemical  
Reduction, electrochemical  
(of **calixarenes** on glassy carbon or platinum in acetonitrile)

IT UV and visible spectra  
(of sulfophenylazo deriv. of **calixarene**)

IT Substituent effects  
(on cyclic voltammetry of **calixarenes**)

IT 7440-21-3, Silicon, properties  
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)  
(anisotropic **etching** of silicon in alk. soln. contg. **calixarene** complexant)

IT 124411-21-8  
RL: NUJ (Other use, unclassified); PRP (Properties); RCT (Reactant); RACT (Reactant or reagent); USES (Uses)  
(anisotropic **etching** of silicon in alk. soln. contg. complexant)

IT 7440-06-4, Platinum, uses 7440-44-0, Carbon, uses  
RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(cyclic voltammetry of **calixarenes** on glassy carbon or platinum in acetonitrile)

IT 429-42-5, Tetrabutylammonium tetrafluoroborate  
RL: NUJ (Other use, unclassified); PRP (Properties); USES (Uses)  
(cyclic voltammetry of **calixarenes** on glassy carbon or platinum in acetonitrile contg.)

IT 7446-70-0, Aluminum chloride, uses  
RL: CAT (Catalyst use); USES (Uses)  
(in debutylation of **calixarene** tert-Bu deriv. in phenol)

IT 74568-07-3P 123796-82-7P 262428-23-9P 262428-24-0P  
RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(prepn. and cyclic voltammetry on glassy carbon or platinum in acetonitrile)

IT 60705-62-6P  
RL: PRP (Properties); RCT (Reactant); SPN (Synthetic preparation); PREP (Preparation); RACT (Reactant or reagent)  
(prepn. and dealkylation in toluene contg. phenol and aluminum chloride and cyclic voltammetry on platinum in acetonitrile)

IT 100-05-0 119-66-4 262428-25-1  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction with **calixarene** in NaOH)

IT 98-54-4, p-tert-Butylphenol  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction with formaldehyde in NaOH in **calixarene** tert-Bu deriv. prepn.)

IT 50-00-0, Formaldehyde, reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(reaction with p-tert-butylphenol in NaOH in **calixarene** tert-Bu deriv. prepn.)

RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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- (12) Ristic, L; Sensor Technology and Devices 1994, P67
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L3 ANSWER 13 OF 30 CA COPYRIGHT 2002 ACS

AN 132:71961 CA

TI Anisotropic **etching** of silicon in a complexant redox alkaline system

AU Moldovan, Carmen; Iosub, Rodica; Dascalu, Dan; Nechifor, Gheorghe

CS National Institute for R and D in Microtechnologies, Bucharest, R72225, Rom.

SO Sensors and Actuators, B: Chemical (1999), B58(1-3), 438-449

CODEN: SABCEB; ISSN: 0925-4005

PB Elsevier Science S.A.

DT Journal

LA English

CC 76-3 (Electric Phenomena)

AB This paper presents the results from the investigation of the chem. anisotropic **etching** of single-crystal silicon 100 in the following solns.: KOH, K<sub>3</sub>[Fe(CN)<sub>6</sub>] 0.1 M, K<sub>4</sub>[Fe(CN)<sub>6</sub>].3H<sub>2</sub>O 0.1 M, KNO<sub>3</sub> 0.1 M and or complexant added. The complexant added in KOH soln. were: **calix**[4]arenes, phenols and ether dibenzo-18-crown-6. The reaction mechanism, the **etch** rate, the roughness and the hillocks are analyzed. The results allow us to use the redox system and/or the org. complexants to monitor the **etching** process, to obtain a smooth silicon surface with increased **etch** rate and to utilize the usual mask material resistant at the new **etchants**.

ST silicon anisotropic **etching** **etchant** redox alk

IT Surface roughness

(after **etching** anal. of; anisotropic **etching** of silicon in a complexant redox alk. system)

IT **Etching**

(anisotropic, of silicon; anisotropic **etching** of silicon in a complexant redox alk. system)

IT Redox reaction

(complexant, alk. system; anisotropic **etching** of silicon in a complexant redox alk. system)

IT Surface structure

(hillocks, after **etching** anal. of; anisotropic **etching** of silicon in a complexant redox alk. system)

IT 98-54-4, p-tert-Butylphenol 108-95-2, Phenol, uses 281-54-9,

**Calix**[4]arene 14187-32-7, Dibenzo-18-crown-6 25154-52-3,

Nonylphenol 60705-62-6, p-tert-Butyl **calix**[4]arene

RL: MOA (Modifier or additive use); USES (Uses)

(anisotropic **etching** of silicon in a complexant redox alk. system)

IT 7440-21-3, Silicon, properties

RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)

(anisotropic **etching** of silicon in a complexant redox alk. system)

IT 221181-37-9

RL: MOA (Modifier or additive use); USES (Uses)

(azo calix[4]arene; anisotropic etching of silicon in a complexant redox alk. system)

IT 1310-58-3, Potassium hydroxide, properties 7757-79-1, Nitric acid potassium salt, properties 13746-66-2, Iron potassium cyanide (FeK<sub>3</sub>(CN)<sub>6</sub>) 14459-95-1, Iron potassium cyanide (FeK<sub>4</sub>(CN)<sub>6</sub>) trihydrate  
RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)  
(etchant; anisotropic etching of silicon in a complexant redox alk. system)

RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

- (1) Abe, T; J Microelectromech Syst 1998, V7, P94
- (2) Bressers, P; J Electrochem Soc 1996, V143, P1744 CA
- (3) Elwenspoek, M; 9th Micromechanics Europe Workshop MME'98 1991, P70
- (4) Gutsche, C; J Am Chem Soc 1981, V103, P3782 CA
- (5) Moldovan, C; Abstract Book workshop of physical chemistry of wet chemical etching of silicon 1998, P21
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- (7) Ristic, L; Sensor Technology and Devices P67
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- (11) Shinkai, S; J Chem Soc Perkin Trans 1 1990, P3333 CA
- (12) Tan, S; J Microelectromech Syst 1996, V5, P65

L3 ANSWER 14 OF 30 CA COPYRIGHT 2002 ACS

AN 131:66347 CA

TI Silicon hillocks elimination using a complexant redox alkaline system

AU Moldovan, Carmen; Iosub, Rodica; Dascalu, Dan; Nechifor, Gheorghe; Danila, Carmen

CS National Institute for R and D in Microtechnologies, Bucharest, R72225, Rom.

SO Proceedings of SPIE-The International Society for Optical Engineering (1999), 3680(Pt. 2, Design, Test and Microfabrication of MEMS and MOEMS), 1056-1067

CODEN: PSISDG; ISSN: 0277-786X

PB SPIE-The International Society for Optical Engineering

DT Journal

LA English

CC 76-3 (Electric Phenomena)

AB This paper presents the results from the investigation of the chem. anisotropic etching of single-crystal silicon

.ltbbbrac.100.rtbbbrac. in the following solns.: KOH (or NaOH, LiOH.cntdot.H<sub>2</sub>O), K<sub>3</sub>[Fe(CN)<sub>6</sub>] 0.1M, K<sub>4</sub>[Fe(CN)<sub>6</sub>] .cntdot.3H<sub>2</sub>O 0.1M, KNO<sub>3</sub> 0.1M and/or complexant added. The complexants added in KOH soln. were: calix[4]arenes, phenols, and ether dibenzo 18 crown 6. Results using also NaOH or LiOH.cntdot.H<sub>2</sub>O and complexants are presented. The reaction mechanism and the hillocks formation and elimination are analyzed. The results allow us to use the redox system and/or the org. complexants, to monitor the etching process, to obtain a smooth silicon surface, almost free of hillocks, to utilize the usual mask material resistant to the new etchants.

ST silicon hillock elimination; complexant redox alk system silicon hillock

IT 7440-21-3, Silicon, processes

RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(silicon hillock elimination using complexant redox alk. system)

RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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- (4) Moldovan, C; EUROSENSORS XII Proceedings V2, P1009 CA
- (5) Moldovan, C; Workshop of Physical Chemistry of Wet Chemical Etching of Silicon 1998, P21

- (6) Ristic, L; Sensor Technology and Devices 1994, P67  
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(8) Seidel, H; Journal of the Electrochemical Society 1990, V137, P3612 CA  
(9) Shinkai, S; J Chem Soc Perkin Trans 1 1990, P3333 CA  
(10) Tan, S; Journal of Microelectromechanical Systems 1996, V5, P65

L3 ANSWER 15 OF 30 CA COPYRIGHT 2002 ACS

AN 130:317109 CA

TI Anisotropic **etching** of silicon in a complexant redox alkaline system

AU Moldovan, Carmen; Iosub, Rodica; Dascalu, Dan; Nechifor, Gheorghe.

CS Institute of Microtechnology, Bucharest, R72225, Rom.

SO Eurosensors XII, Proceedings of the 12th European Conference on Solid-State Transducers and the 9th UK Conference on Sensors and Their Applications, Southampton, UK, Sept. 13-16, 1998 (1998), Volume 2, 1009-1012. Editor(s): White, N. M. Publisher: Institute of Physics Publishing, Bristol, UK.

CODEN: 67PNAZ

DT Conference

LA English

CC 67-3 (Catalysis, Reaction Kinetics, and Inorganic Reaction Mechanisms)

AB This paper presents the results from an investigation of the chem. anisotropic **etching** of silicon in the following soln.: KOH 4.5M, K3[Fe(CN)6] 0.1M, K4[Fe(CN)6] 3H2O 0.1M, KNO3 0.1M and complexant added. The reaction mechanism, the **etch** rate and the roughness are analyzed.

ST hydroxide potassium anisotropic **etching** kinetics silicon;  
ferricyanide potassium anisotropic **etching** kinetics silicon;  
ferrocyanide potassium anisotropic **etching** kinetics silicon;  
nitrate potassium anisotropic **etching** kinetics silicon;  
complexant redox alk anisotropic **etching** kinetics silicon

IT **Etching** kinetics

(anisotropic **etching** of silicon in complexant redox alk. system)

IT Crown ethers

Metacyclophanes

RL: PEP (Physical, engineering or chemical process); PRP (Properties); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)

(anisotropic **etching** of silicon in complexant redox alk. system)

IT **Etching**

(mechanism; anisotropic **etching** of silicon in complexant redox alk. system)

IT 281-54-9, **Calix**-4-arene 1310-58-3, Potassium hydroxide, reactions 7440-21-3, Silicon, reactions 7757-79-1, Potassium nitrate, reactions 13746-66-2, Potassium ferricyanide 13943-58-3, Potassium ferrocyanide 14187-32-7, Dibenzo-18-crown-6

RL: PEP (Physical, engineering or chemical process); PRP (Properties); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)

(anisotropic **etching** of silicon in complexant redox alk. system)

RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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(2) Ristic, L; Sensor Technology and Devices 1994, P67  
(3) Seidel, H; J Electrochem Soc 1990, V137(11), P3612 CA

L3 ANSWER 16 OF 30 CA COPYRIGHT 2002 ACS

AN 130:260101 CA

TI Mechanism of anisotropic **etching** of silicon in a complexant alkaline system

AU Moldovan, Carmen; Iosub, Rodica; Nechifor, Ghe.; Dascalu, D.; Craciunoiu, F.; Serban, B.

CS National Institute for Research and Development in Microtechnologies,



Bucharest, R72225, Rom.

SO CAS '98 Proceedings, International Semiconductor Conference, 21st, Sinaia, Rom., Oct. 6-10, 1998 (1998), Volume 2, 353-356 Publisher: Institute of Electrical and Electronics Engineers, New York, N. Y.

CODEN: 67HUAG

DT Conference

LA English

CC 76-3 (Electric Phenomena)

AB This paper presents the results of the study and expts. of the chem. anisotropic **etching** of silicon in a complexant alk. system (KOH 4.5M and complexants added). The great results obtained using **calix[4]arene** like complexant make necessary the study of the mechanism of the silicon **etch** rate increasing and of the roughness minimizing. A new macrocyclic complexant (azocalix[4]arene) and indicator of pH for silicon **etching** soln., the **etch** rate and the roughness are analyzed. The complexant alk. system for anisotropic **etching** of silicon is an absolutely original idea of the authors.

ST silicon anisotropic **etching** cleaning mechanism; alkali system

IT **Etching**  
Semiconductor materials  
(mechanism of anisotropic **etching** of silicon in a complexant alk. system)

IT 7440-21-3, Silicon, processes  
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(mechanism of anisotropic **etching** of silicon in a complexant alk. system)

IT 1310-58-3, Potassium hydroxide (KOH), reactions  
RL: RCT (Reactant); RACT (Reactant or reagent)  
(mechanism of anisotropic **etching** of silicon in a complexant alk. system)

RE.CNT 5 THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Luca, C; Aplicatii ale Chimiei Supramoleculare 1996

(2) Moldovan, C; Anisotropic Etching of Silicon in a Complexant Redox Alkaline System 1998, EUROSensors XII

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(4) Ristic, L; Sensor Technology and Devices 1994, P67

(5) Seidel, H; J Electrochem Soc 1990, V137(11), P3612 CA

L3 ANSWER 17 OF 30 CA COPYRIGHT 2002 ACS

AN 130:202831 CA

TI Sub-10 nm electron beam lithography using a poly(.alpha.-methylstyrene) resist with a molecular weight of 650

AU Manako, Shoko; Fujita, Jun-Ichi; Tanigaki, Katsumi; Ochiai, Yukinori; Nomura, Eiichi

CS Fundamental Research Laboratories, NEC Corporation, Tsukuba, 305-8501, Japan

SO Japanese Journal of Applied Physics, Part 1: Regular Papers, Short Notes & Review Papers (1998), 37(12B), 6785-6787

CODEN: JAPNDE; ISSN: 0021-4922

PB Japanese Journal of Applied Physics

DT Journal

LA English

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

AB Only the 7 nm patterning has been achieved by using an org. neg. electron beam (EB) resist, poly(.alpha.-methylstyrene) resist with a mol. wt. of 650 (.alpha.-MST650). An .alpha.-MST650 resist film can be prepd. by a conventional spin-coating technique and its surface roughness is smooth, with peak-to-valley roughness of less than 1.5 nm. Although the

sensitivity of .alpha.MST650 is very low, 30 mC/cm<sup>2</sup>, high-resoln. patterns of 15 nm width and 25 nm pitch with no scum have been fabricated using a 50 kV electron beam of about 7 nm diam. The **etching** selectivity between Si and .alpha.MST650 is about 2.3 and the **etching** durability of .alpha.MST650 is superior to those of **calixarene** resist and polystyrene resist. The min. line pattern sizes achievable with .alpha.MST650 resist is 7 nm, although the min. line pattern size of polystyrene with a mol. wt. of 1100 is about 12 nm. The pattern size dependence of resist resin mol. wt. exit in beyond resist mol. wt. of 650.

ST electron beam lithog polymethylstyrene resist

IT Electron beam resists

(sub-10 nm electron beam lithog. using poly(.alpha.-methylstyrene) resist with mol. wt. of 650)

IT 75-73-0, Carbon tetrafluoride

RL: NUU (Other use, unclassified); USES (Uses)

(plasma **etch**; sub-10 nm electron beam lithog. using poly(.alpha.-methylstyrene) resist with mol. wt. of 650)

IT 25014-31-7, Poly(.alpha.-methylstyrene)

RL: TEM (Technical or engineered material use); USES (Uses)

(sub-10 nm electron beam lithog. using poly(.alpha.-methylstyrene) resist with mol. wt. of 650)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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(2) Brandrup, J; Polymer Handbook 3rd ed 1989

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(4) Chou, S; J Vac Sci Technol B 1997, V15, P2897 CA

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(7) Manako, S; Jpn J Appl Phys 1997, V36, P7773 CA

(8) Manako, S; Jpn J Appl Phys 1997, V36, PL724 CA

(9) Yoshimura, T; Appl Phys Lett 1996, V68, P1799 CA

L3 ANSWER 18 OF 30 CA COPYRIGHT 2002 ACS

AN 130:132297 CA

TI 25-nm-pitch (Ga,In)As/InP buried structure: improvement by **calixarene** as an electron beam resist and tertiarybutylphosphine as a P source in organometallic vapor phase epitaxy regrowth

AU Miyamoto, Y.; Kokubo, A.; Hattori, T.; Hongo, H.; Suhara, M.; Furuya, K.  
CS Department of Electrical and Electronic Engineering, Tokyo Institute of Technology, O-okayama, Meguro-ku, Tokyo, 152, Japan

SO Journal of Vacuum Science & Technology, B: Microelectronics and Nanometer Structures (1998), 16(6), 3894-3898

CODEN: JVTBD9; ISSN: 0734-211X

PB American Institute of Physics

DT Journal

LA English

CC 76-3 (Electric Phenomena)

AB To achieve a fine periodic semiconductor structure by electron-beam lithog., **calixarene** was used as an electron-beam resist. A 25-nm-pitch InP pattern was formed successfully, and 40-nm-pitch InP structures were achieved with good reproducibility. A shorter developing time, precise stage motion, accurate control of the widths of lines and spaces, and slight O<sub>2</sub> ashing were important to obtain a fine InP pattern by a two-step wet chem. **etching** process. Further, the fabricated periodic InP pattern was buried in a (Ga,In)As structure by organometallic vapor phase epitaxy. The introduction of tertiarybutylphosphine as the phosphorus source prevented the fine structure from deforming when the temp. was raised and a 25-nm-pitch periodic structure was buried successfully.

ST indium phosphide fine periodic structure fabrication

IT Electron beam resists

(**calixarene**; fabrication of fine periodic InP structure by

electron-beam lithog using **calixarene** electron-beam resist)

IT Electron beam lithography  
(fabrication of fine periodic InP structure by electron-beam lithog using **calixarene** electron-beam resist)

IT 141137-71-5  
RL: NUU (Other use, unclassified); USES (Uses)  
(electron-beam resist; fabrication of fine periodic InP structure by electron-beam lithog using **calixarene** electron-beam resist)

IT 22398-80-7, Indium monophosphide, uses  
RL: DEV (Device component use); USES (Uses)  
(fabrication of fine periodic InP structure by electron-beam lithog using **calixarene** electron-beam resist)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

(1) Coldren, L; Electron Lett 1982, V18, P235 CA  
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(3) Fujita, J; Appl Phys Lett 1996, V68, P1297 CA  
(4) Furuya, K; J Appl Phys 1987, V62, P1492  
(5) Hongo, H; Jpn J Appl Phys Part 1 1994, V33, P925 CA  
(6) Hongo, H; Jpn J Appl Phys Part 1 1998, V37, P1518 CA  
(7) Inamura, E; Jpn J Appl Phys Part 1 1989, V28, P2193 CA  
(8) Komeno, J; J Cryst Growth 1994, V145, P468 CA  
(9) Suhara, M; J Cryst Growth 1994, V145, P698 CA

L3 ANSWER 19 OF 30 CA COPYRIGHT 2002 ACS  
AN 129:237591 CA  
TI **Calixarene** resists for nano-lithography  
AU Ohnishi, Yoshitake; Wamme, Naoko; Fujita, Jun-Ichi  
CS Fundamental Research Laboratories, NEC Corporation, Tsukuba, 305, Japan  
SO ACS Symp. Ser. (1998), 706 (Micro- and Nanopatterning Polymers), 249-261  
CODEN: ACSMC8; ISSN: 0097-6156  
PB American Chemical Society  
DT Journal  
LA English  
CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

AB **Calixarenes** were developed as neg. electron resists for nano-lithog. These cluster-like, or roughly ball-shaped mols. form very flat and hard films by spin-coating. The high resoln. of these resists down to several nm is because these mols. are quite small and free as is in ordinary chain polymers. As **etching** resistance of **calixarenes** is sufficient in plasma-etch processes, nano-fabrication of metal or semiconductors is easily carried out by conventional resist processes.

ST **calixarene** resist nanolithog

IT Clusters  
Etching  
Lithography  
Mass spectra  
Resists  
Spin coating  
(**calixarene** resists for nanolithog.)

IT Metacyclophanes  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(**calixarene** resists for nanolithog.)

IT 124006-38-8 141137-71-5  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(**calixarene** resists for nanolithog.)

L3 ANSWER 20 OF 30 CA COPYRIGHT 2002 ACS  
AN 129:209993 CA  
TI A 25-nm-pitch GaInAs/InP buried structure using **calixarene**

resist

AU Kokubo, Atsushi; Hattori, Etsuya; Hongo, Hiroo; Suhara, Michihiko;  
Miyamoto, Yasuyuki; Furuya, Kazuhito

CS Department of Electrical and Electronic Engineering, Tokyo Institute of  
Technology, Okayama, Meguro-ku, Tokyo, 152, Japan

SO Jpn. J. Appl. Phys., Part 2 (1998), 37(7A), L827-L829  
CODEN: JAPLD8; ISSN: 0021-4922

PB Japanese Journal of Applied Physics

DT Journal

LA English

CC 76-3 (Electric Phenomena)  
Section cross-reference(s): 74

AB To realize a fine periodical pattern by electron beam lithog., a study for  
using **calixarene** as a resist was carried out. A 25-nm-pitch  
resist pattern was fabricated and transferred to a thin InP layer by  
2-step wet chem. **etching**. Precise slight O2 ashing, to  
eliminate residual matter was essential to transfer the pattern by wet  
**etching**. The controllability of the width was improved when using  
**calixarene**, when the period was 40 nm. Also, a 25-nm-pitch InP  
pattern was buried in a GaInAs structure by OMVPE. This technol. could be  
applied to realize electron wave devices.

ST gallium indium arsenide phosphide **calixarene** resist; buried  
structure **calixarene** resist arsenide phosphide

IT Electron beam lithography  
**Etching**  
Metalorganic vapor phase epitaxy  
Plasma ashing  
Resists  
(a 25-nm-pitch GaInAs/InP buried structure using **calixarene**  
resist)

IT Metacyclophanes  
RL: DEV (Device component use); USES (Uses)  
(a 25-nm-pitch GaInAs/InP buried structure using **calixarene**  
resist)

IT 22398-80-7, Indium phosphide, properties 106070-25-1, Gallium indium  
arsenide  
RL: DEV (Device component use); PRP (Properties); USES (Uses)  
(a 25-nm-pitch GaInAs/InP buried structure using **calixarene**  
resist)

L3 ANSWER 21 OF 30 CA COPYRIGHT 2002 ACS

AN 128:187114 CA

TI Single-electron transistors fabricated from a doped-Si film in a  
silicon-on-insulator substrate

AU Sakamoto, T.; Kawaura, H.; Baba, T.

CS NEC Fundamental Research Laboratories, Tsukuba, Ibaraki, 305, Japan

SO Appl. Phys. Lett. (1998), 72(7), 795-796  
CODEN: APPLAB; ISSN: 0003-6951

PB American Institute of Physics

DT Journal

LA English

CC 76-3 (Electric Phenomena)

AB The authors propose doped-thin-Si-film single-electron transistors  
(DS-SETs), which are fabricated from a highly doped Si film in a  
Si-on-insulator substrate by electron-beam lithog. with a high-resoln.  
resist (**calixarene**) and dry **etching** with CF4 gas.  
Because the structure can be well controlled, the DS-SET with a  
45-nm-diam. island shows nearly ideal characteristics of SETs with a  
charging energy of 1.4 meV. Single-electron tunneling occurs through a  
single island without any isolated islands formed in potential  
fluctuations. The authors also discuss the discreteness of energy levels  
in a Si island.

ST single electron transistor doped silicon film

IT Dry **etching**

Electron beam lithography  
(single-electron transistors fabricated from doped-Si film in  
silicon-on-insulator substrate by)

- IT Transistors  
(single-electron; single-electron transistors fabricated from doped-Si  
film in silicon-on-insulator substrate)
- IT 7440-21-3, Silicon, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(single-electron transistors fabricated from doped-Si film in  
silicon-on-insulator substrate)
- IT 75-73-0, Carbon fluoride (CF<sub>4</sub>)  
RL: TEM (Technical or engineered material use); USES (Uses)  
(single-electron transistors fabricated from doped-Si film in  
silicon-on-insulator substrate by dry **etching** with)

L3 ANSWER 22 OF 30 CA COPYRIGHT 2002 ACS

AN 128:147408 CA

TI **Calixarene** electron beam resist for nano-lithography

AU Fujita, Jun-ichi; Ohnishi, Yoshitake; Manako, Shoko; Ochiai, Yukinori;  
Nomura, Eiichi; Sakamoto, Toshitsugu; Matsui, Shiniji

CS Fundamental Res. Lab., NEC Corp., Tsukuba, 305, Japan

SO Jpn. J. Appl. Phys., Part 1 (1997), 36(12B), 7769-7772

CODEN: JAPNDE; ISSN: 0021-4922

PB Japanese Journal of Applied Physics

DT Journal

LA English

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other  
Reprographic Processes)

AB New electron beam (EB) resists made of **calixarene** resists are  
introduced. Typical sensitivities of **calixarene** resists range  
from 700 .mu./C/cm<sup>2</sup> to 7 mC/cm<sup>2</sup>. High-d. dot arrays with 15 nm diam.  
constructed using **calixarene** resist were easily delineated using  
a point EB lithog. system. Our results suggest that the resolu. limit of  
**calixarene** resists is dominated by a development process such as  
adhesion to a substrate rather than by the EB profile. **Calixarene**  
resists are resistant to **etching** by halide plasma. We also  
demonstrated nanoscale devices processed by using **calixarene**  
resists. **Calixarene** resists are promising materials for  
nanofabrication.

ST **calixarene** electron beam resist nano lithog

IT Electron beam resists

(**calixarene**; for nano-lithog.)

IT Metacyclophanes

RL: PRP (Properties); TEM (Technical or engineered material use); USES  
(Uses)

(electron beam resist for nano-lithog.)

IT Electron beam lithography

(nano-; **calixarene** electron beam resist for)

IT 124006-38-8 141137-71-5

RL: PRP (Properties); TEM (Technical or engineered material use); USES  
(Uses)

(electron beam resist for nano-lithog.)

L3 ANSWER 23 OF 30 CA COPYRIGHT 2002 ACS

AN 128:121581 CA

TI Process optimization for production of sub-20 nm soft x-ray zone plates

AU Spector, S. J.; Jacobsen, C. J.; Tennant, D. M.

CS Department of Physics, SUNY at Stony Brook, Stony Brook, NY, 11794, USA

SO J. Vac. Sci. Technol., B (1997), 15(6), 2872-2876

CODEN: JVTBD9; ISSN: 0734-211X

PB American Institute of Physics

DT Journal

LA English

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other

Reprographic Processes)

Section cross-reference(s) : 73

- AB We report here the optimization of processes for producing sub-20 nm soft x-ray zone plates, using a general purpose electron beam lithog. system and com. resist technologies. We have critically evaluated the failure point of the various process steps and where possible chosen alternate methods, materials, or otherwise modified the process. Advances have been made in most steps of the process, including the imaging resist, pattern conversion for electron beam exposure, and pattern transfer. Two phase shifting absorber materials, germanium and nickel, were compared. Zone plates with 30 nm outer zones have been fabricated in both germanium and nickel with excellent quality using PMMA and zones as small as 20 nm have been fabricated in nickel using the **calixarene** resist. The total efficiency as well as the efficiency of different regions of the zone plates were measured. All zone plates have demonstrated good efficiencies, with nickel zone plates performing better than germanium zone plates.
- ST x ray zone plate lithog fabrication
- IT X-ray devices  
(lenses; process optimization for electron lithog. prodn. of sub-20 nm soft x-ray zone plates)
- IT Electron beam lithography  
Electron beam resists  
(process optimization for electron lithog. prodn. of sub-20 nm soft x-ray zone plates)
- IT Lenses  
(x-ray; process optimization for electron lithog. prodn. of sub-20 nm soft x-ray zone plates)
- IT Optical instruments  
(zone plates, Fresnel, x-ray; process optimization for electron lithog. prodn. of sub-20 nm soft x-ray zone plates)
- IT 67-63-0, Isopropanol, uses 108-10-1, Methyl isobutyl ketone  
RL: NUU (Other use, unclassified); USES (Uses)  
(developer; process optimization for electron lithog. prodn. of sub-20 nm soft x-ray zone plates)
- IT 75-63-8, Trifluorobromomethane 7782-44-7, Oxygen, uses  
RL: NUU (Other use, unclassified); USES (Uses)  
(**etchant**; process optimization for electron lithog. prodn. of sub-20 nm soft x-ray zone plates)
- IT 12033-89-5; Silicon nitride, processes  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(process optimization for electron lithog. prodn. of sub-20 nm soft x-ray zone plates)
- IT 9011-14-7, PMMA 89072-52-6, AZ 4110  
RL: PEP (Physical, engineering or chemical process); PROC (Process)  
(process optimization for electron lithog. prodn. of sub-20 nm soft x-ray zone plates)
- IT 7440-02-0, Nickel, processes 7440-56-4, Germanium, processes  
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
(shifting absorber; process optimization for electron lithog. prodn. of sub-20 nm soft x-ray zone plates)
- L3 ANSWER 24 OF 30 CA COPYRIGHT 2002 ACS
- AN 127:314181 CA
- TI Strategies toward the development of integrated chemical sensors fabricated from light emitting porous silicon
- AU Coffey, Jeffery L.; Zhang, Libing; John, John St.
- CS Department of Chemistry, Texas Christian University, Ft. Worth, TX, 76129, USA
- SO Proc. SPIE-Int. Soc. Opt. Eng. (1997), 3226 (Microelectronic Structures and MEMS for Optical Processing III), 168-179  
CODEN: PSISDG; ISSN: 0277-786X

PB SPIE-The International Society for Optical Engineering  
 DT Journal  
 LA English  
 CC 79-2 (Inorganic Analytical Chemistry)  
 Section cross-reference(s): 73, 76, 80  
 AB Several different approaches designed to produce an opto-electronic chem. sensor based on light-emitting porous Si are described, all of which entail modification of the as-formed porous Si surface to alter device characteristics. The issue of selectivity and sensitivity of a given porous Si sensor can be modified by coating the porous Si surface with basket-shaped mols. known as **calixarenes**; the ability of such a structure to detect copper ions and organonitrogen compds. is reported. Surface modification of porous Si through **etching** and deposition of conducting polymers to alter Si light emission color and intensity is also discussed. The fabrication of porous Si-based waveguides on Si and the impact of surface modification with erbium ions are also described.  
 ST integrated sensor light emitting porous silicon; copper detection light emitting silicon sensor; amine detection light emitting silicon sensor; **calixarene** coating light emitting silicon sensor; conducting polymer coating light emitting silicon; erbium effect porous silicon waveguide  
 IT Waveguides  
 (fabrication of porous Si-based waveguides on porous Si and impact of surface modification with erbium ions)  
 IT Electroluminescent devices  
 (integrated chem. sensors fabricated from light emitting porous silicon)  
 IT Amines, analysis  
 RL: ANT (Analyte); PRP (Properties); ANST (Analytical study)  
 (integrated chem. sensors fabricated from light emitting porous silicon for detection of)  
 IT Luminescence  
 (photoluminescence quenching of **calixarene** coated porous silicon by Cu(II) and amines)  
 IT Optical sensors  
 (semiconductive luminescence; integrated chem. sensors fabricated from light emitting porous silicon)  
 IT Electroluminescence  
 (tunability; of conducting polymer coated porous silicon for chem. sensors)  
 IT 11106-95-9  
 RL: NUU (Other use, unclassified); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)  
 (contact for porous Si light emitting diodes)  
 IT 7440-52-0, Erbium, uses  
 RL: NUU (Other use, unclassified); PRP (Properties); USES (Uses)  
 (fabrication of porous Si-based waveguides on porous Si and impact of surface modification with erbium ions)  
 IT 7440-21-3, Silicon, analysis  
 RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)  
 (integrated chem. sensors fabricated from light emitting porous silicon)  
 IT 25067-59-8, Poly(9-vinyl carbazole) 190785-27-4  
 RL: ARU (Analytical role, unclassified); DEV (Device component use); PRP (Properties); ANST (Analytical study); USES (Uses)  
 (integrated chem. sensors fabricated from light emitting porous silicon coated with)  
 IT 107-10-8, 1-Propanamine, analysis 109-73-9, 1-Butanamine, analysis  
 110-58-7, n-Pentylamine 7440-50-8, Copper, analysis  
 RL: ANT (Analyte); PRP (Properties); ANST (Analytical study)  
 (integrated chem. sensors fabricated from light emitting porous silicon for detection of)  
 IT 119707-70-9 119707-72-1 119707-73-2 127594-37-0 185628-43-7

197298-64-9

RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)  
(integrated chem. sensors fabricated from light emitting porous silicon modified with coating contg.)

L3 ANSWER 25 OF 30 CA COPYRIGHT 2002 ACS

AN 127:285942 CA

TI Super-fine pattern formation and super-fine **etching** method using resist containing **calixarene**

IN Onishi, Yoshitake; Fujita, Junichi; Aldoeni, Arturo; Casnati, Alessandro; Pochini, Andrea; Ungaro, Rocco

PA NEC Corp., Japan

SO Jpn. Kokai Tokkyo Koho, 8 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM G03F007-038

ICS C09D165-00; C23F001-00; H01L021-027; H01L021-302

CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 09236919	A2	19970909	JP 1996-157287	19960618
	JP 2792508	B2	19980903		
	US 5702620	A	19971230	US 1996-693672	19960813
PRAI	IT 1996-MI382		19960228		

AB The title patterning method comprises the steps of forming a resist film made of 5,11,17,23,29,35-hexachloromethyl-37,38,39,40,41,42-hexamethoxycalix[6]arene (I) which is sol. in solvents and sensitive toward high energy rays, exposing the film selectively with the rays, and removing the unexposed area with the solvents to develop the exposed area. The title **etching** method comprises forming a pattern on a substrate by the above process and dry-**etching** the substrate along with the pattern. Super-fine resist patterns of the order of nano-meters are obtained. Thus, a soln. of I in dichlorobenzene was coated on a Si wafer, pre-baked, patternwise exposed with an electron beam, and developed with xylene to form a pattern.

ST **calixarene** neg working resist pattern formation; **etching calixarene** neg working resist

IT Resists

(**etching**; super-fine pattern formation using resist contg. **calixarene**)

IT Metacyclophanes

RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(super-fine pattern formation using resist contg. **calixarene**)

IT 106750-73-6P

RL: PNU (Preparation, unclassified); RCT (Reactant); PREP (Preparation) (prepn. of chloromethylmethoxycalixarene)

IT 74-88-4, Methyl iodide, reactions 24566-90-3, Chloromethyl octyl ether 96627-08-6, **Calix**[6]arene

RL: RCT (Reactant)

(prepn. of chloromethylmethoxycalixarene)

IT 124006-38-8P

RL: PNU (Preparation, unclassified); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)

(super-fine pattern formation using resist contg. **calixarene**)

L3 ANSWER 26 OF 30 CA COPYRIGHT 2002 ACS

AN 126:150389 CA

TI Nanometer-scale resolution of **calixarene** negative resist in electron beam lithography



AU Fujita, J.; Ohnishi, Y.; Ochiai, Y.; Nomura, E.; Matsui, S.  
CS Fundamental Research Laboratories, NEC Corporation, Tsukuba, 305, Japan  
SO J. Vac. Sci. Technol., B (1996), 14(6), 4272-4276  
CODEN: JVTBD9; ISSN: 0734-211X  
PB American Institute of Physics  
DT Journal  
LA English  
CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

AB New non-polymer materials, **calixarene** derivs. were tested as high-resoln. neg. resists for use in electron beam lithog. Arrays of 12-nm-diam. dots with a 25 nm pitch were fabricated easily. The sensitivity of **calixarene** in terms of area dose ranged from 700 to 7000 .mu.C/cm2, and the required dose for dot fabrication was about 105 electrons/dot. The std. area dose for **calixarene** is almost 20 times higher than that for polymethyl methacrylate (PMMA), but the electron spot dose for dot fabrication by **calixarene** is almost the same as that for PMMA and other highly sensitive resists such as SAL (chem. amplified neg. resist for electron beam made by Shipley). The electron spot dose for such extremely small dots does not seem to depend on std. area dose, but any resist tends to require the same dose under exposure in a 50 keV electron beam writing system. We propose a qual. exposure model that suggests a tradeoff of dose and dot size. The **calixarene** seems to be promising material for nanofabrication.

ST **calixarene** neg resist electron beam lithog  
IT Resists  
(neg.-working; non-polymer **calixarene** deriv. as high-resoln. neg. resist for electron beam lithog.)

IT Electron beam lithography  
**Etching**  
(non-polymer **calixarene** deriv. as high-resoln. neg. resist for electron beam lithog.)

IT Metacyclophanes  
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(non-polymer **calixarene** deriv. as high-resoln. neg. resist for electron beam lithog.)

IT 124006-38-8 141137-71-5, 5,11,17,23,29,35-Hexamethyl-37,38,39,40,41,42-hexaacetoxycalix[6]arene  
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)  
(non-polymer **calixarene** deriv. as high-resoln. neg. resist for electron beam lithog.)

L3 ANSWER 27 OF 30 CA COPYRIGHT 2002 ACS  
AN 124:215824 CA  
TI Ultrahigh resolution of **calixarene** negative resist in electron beam lithography

AU Fujita, J.; Ohnishi, Y.; Ochiai, Y.; Matsui, S.  
CS Fundam. Res. Lab., NEC Corp., Tsukuba, 305, Japan  
SO Appl. Phys. Lett. (1996), 68(9), 1297-9  
CODEN: APPLAB; ISSN: 0003-6951  
DT Journal  
LA English  
CC 74-5 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

AB A nonpolymer material, **calixarene** deriv. (hexaacetate p-methylcalix[6]arene) was tested as a high-resoln. neg. resist under an electron beam lithog. process. It showed under 10-nm resoln. with little side roughness and high durability to halide plasma **etching**. A sub-10-nm Ge quantum wire was perfectly **etched** off without defects. Such a performance is suitable for nanoscale device processes.

ST electron beam lithog **calixarene** neg resist; hexaacetate methylcalixarene neg resist electron lithog

=> d his

(FILE 'HOME' ENTERED AT 10:07:40 ON 10 MAY 2002)

FILE 'CA' ENTERED AT 10:07:45 ON 10 MAY 2002

L1 6 S DENTRIT? AND ETCH?  
L2 30 S CALIX? AND ETCH?  
L3 30 S L2 NOT L1  
L4 236 S CALIX? AND PHOTO?  
L5 50 S L4 AND HYDROX?  
L6 50 S L5 NOT L3

=> s l6 and glycoluril

357 GLYCOLURIL

L7 0 L6 AND GLYCOLURIL

=> s l6 and glycouril

33 GLYCOURIL

L8 0 L6 AND GLYCOURIL

=> s l6 and powderlink

55 POWDERLINK

L9 0 L6 AND POWDERLINK

=> d his

(FILE 'HOME' ENTERED AT 10:07:40 ON 10 MAY 2002)

FILE 'CA' ENTERED AT 10:07:45 ON 10 MAY 2002

L1 6 S DENTRIT? AND ETCH?  
L2 30 S CALIX? AND ETCH?  
L3 30 S L2 NOT L1  
L4 236 S CALIX? AND PHOTO?  
L5 50 S L4 AND HYDROX?  
L6 50 S L5 NOT L3  
L7 0 S L6 AND GLYCOLURIL  
L8 0 S L6 AND GLYCOURIL  
L9 0 S L6 AND POWDERLINK

=> log y

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STN INTERNATIONAL LOGOFF AT 10:10:51 ON 10 MAY 2002